

FLORIDA HOSPITAL
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FOR SURGICAL ADVANCEMENT

Medical Simulation Standards: What can we learn from DoD?

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Slides Online at: Modelbenders.com

Approved for Public Release.



DoD has learned a lot in 25 years ...



SIMNET, 1989

VBS2, 2011



Military Simulation Elements

Live



Virtual



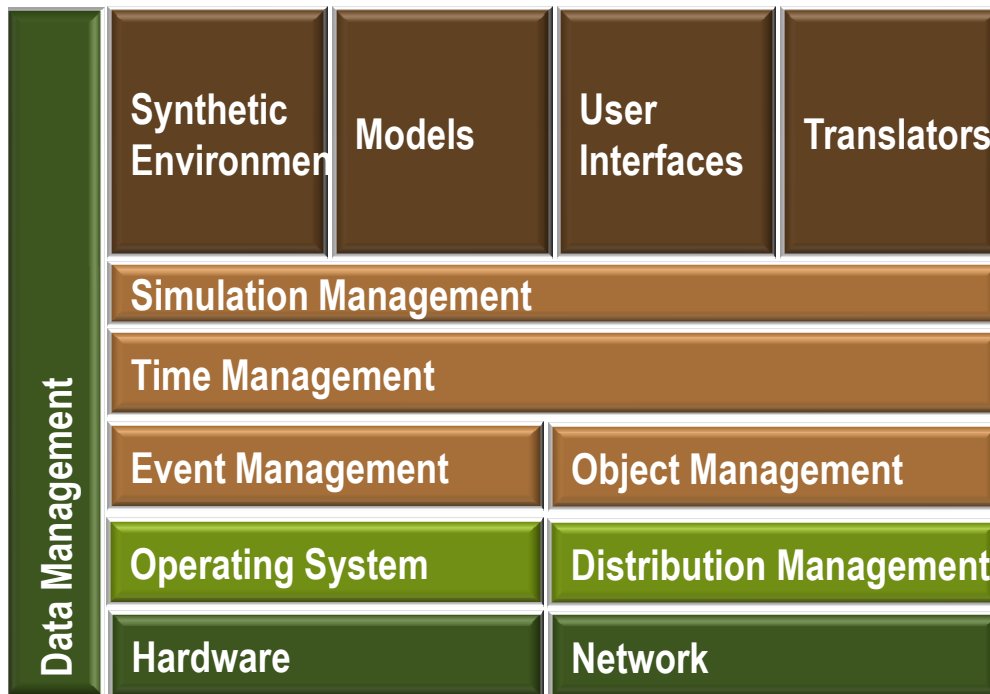
Constructive



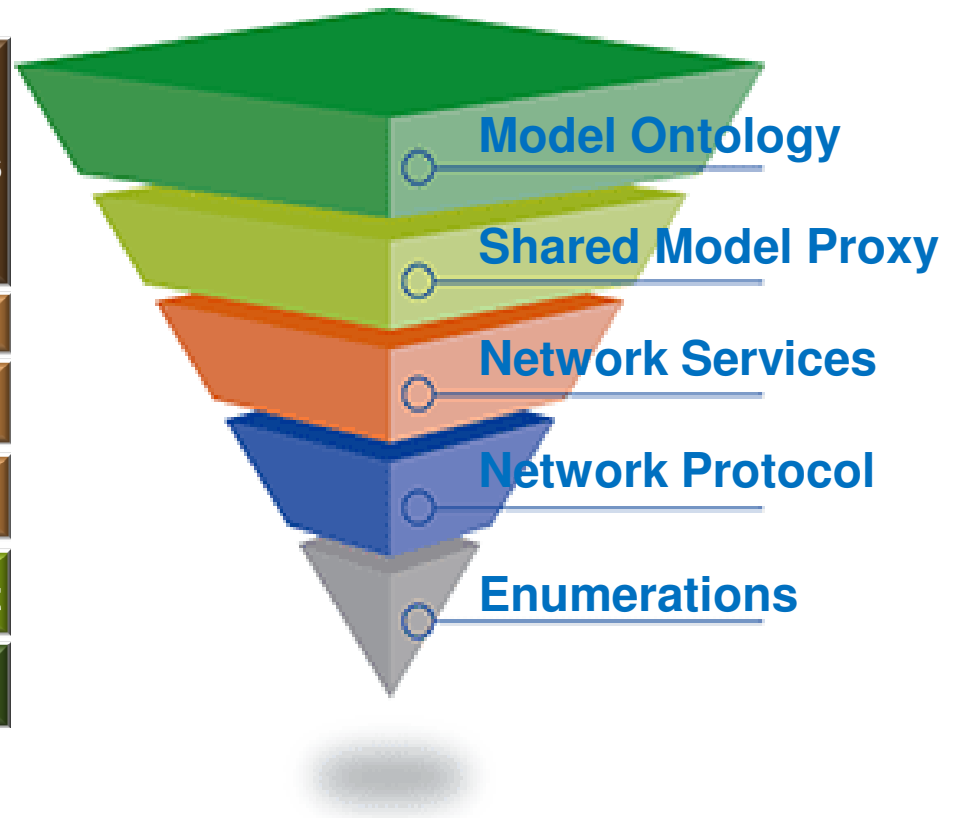
Games

Simulation Standards

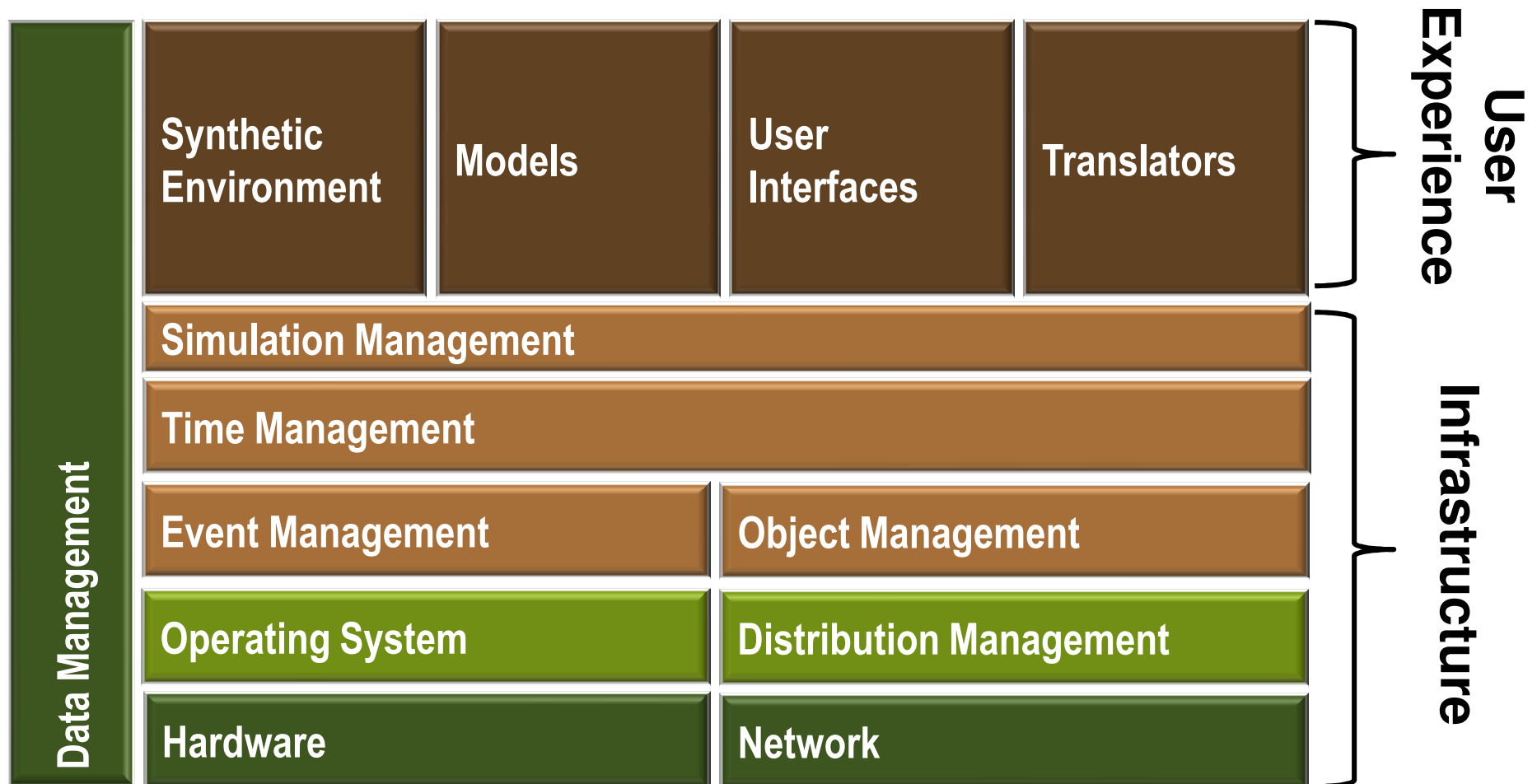
System Design



System Interoperability

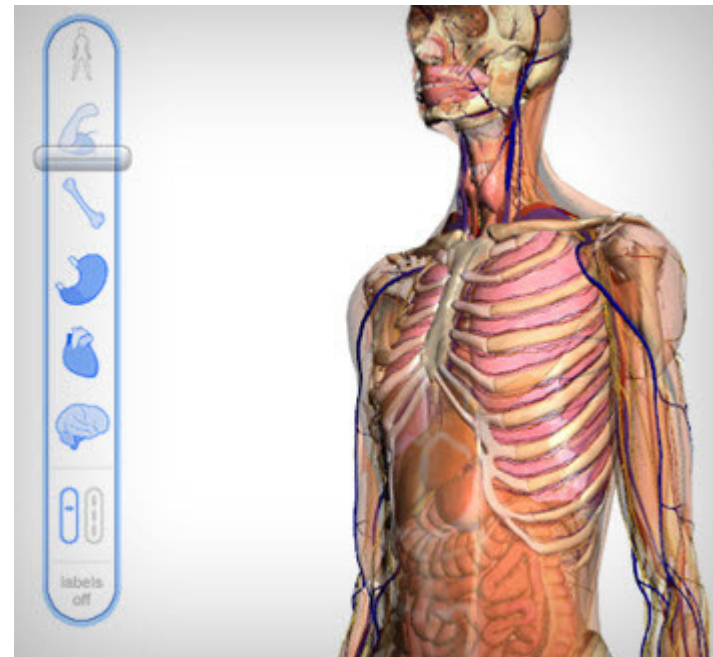
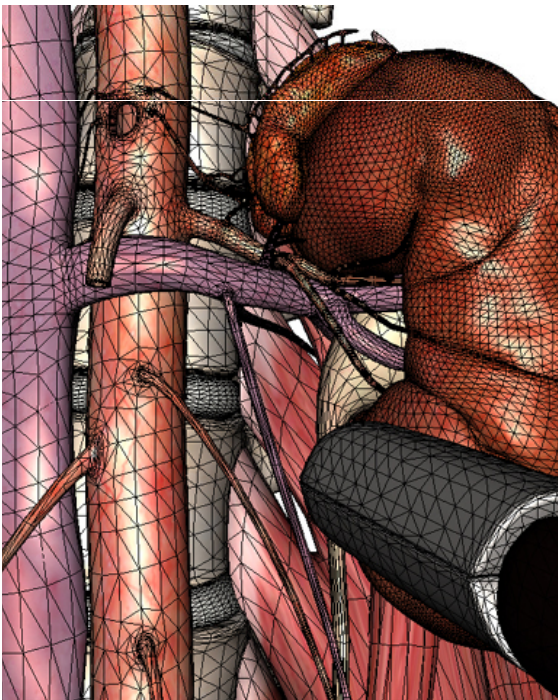


Standards in System Design



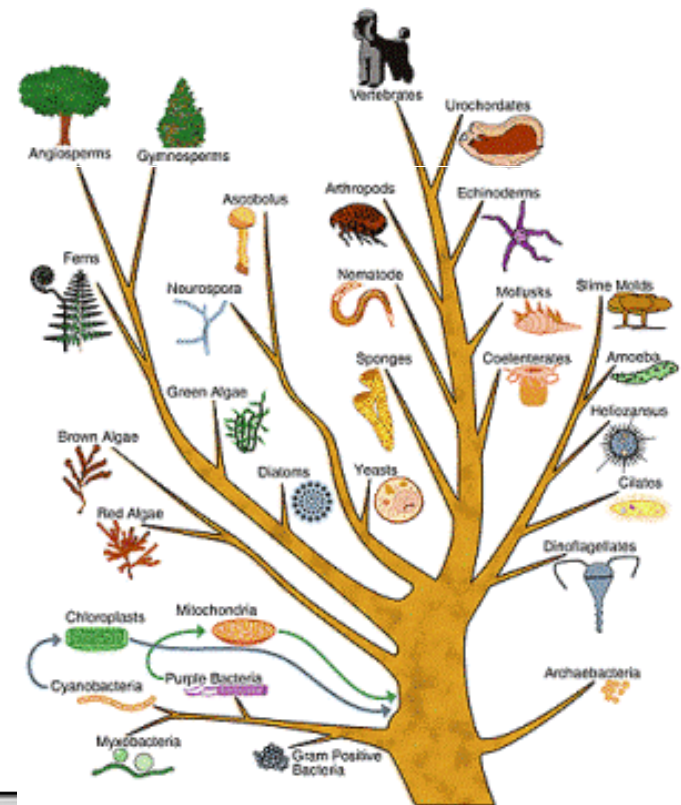
Synthetic Environment

- **Common and shared representation of the background field**
- **Eliminate duplication of the most common objects that are often the least dynamic**



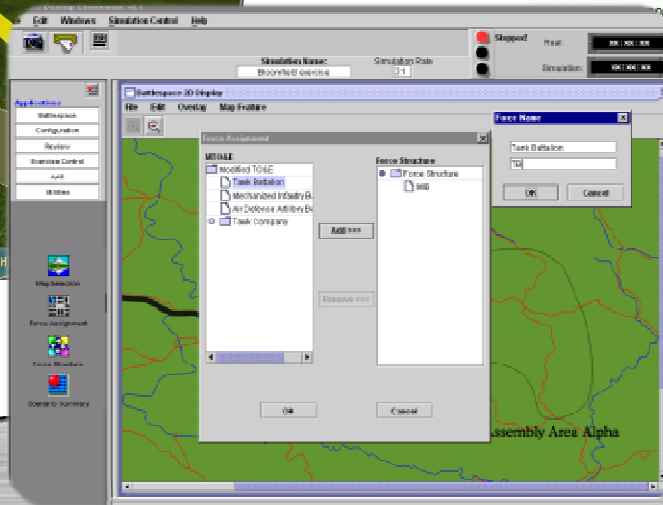
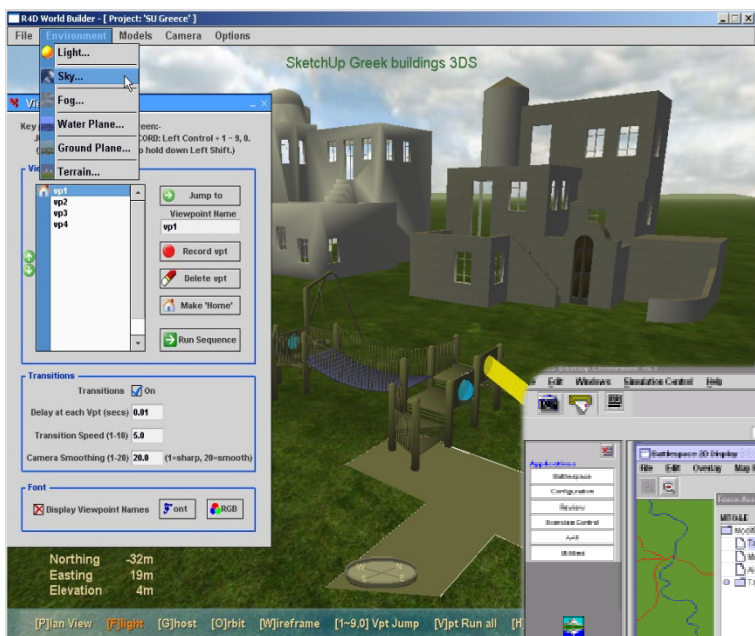
Models

- Structural building blocks for functionality
- Object taxonomy for identity and relationships
- These are the hardest and least advanced

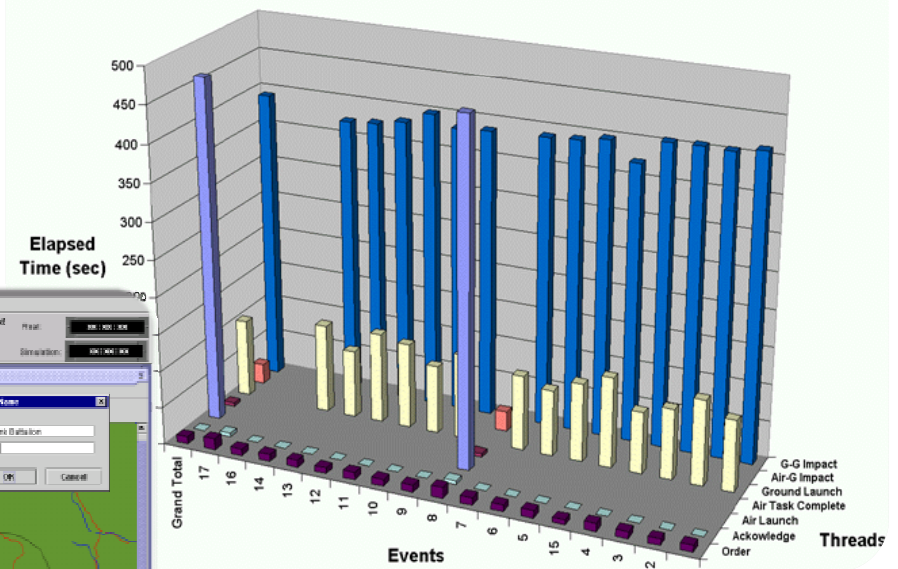


User Interfaces

- Data Creation – building and editing the virtual world
- Data Presentation – performance analysis
- System Controls – operating the system

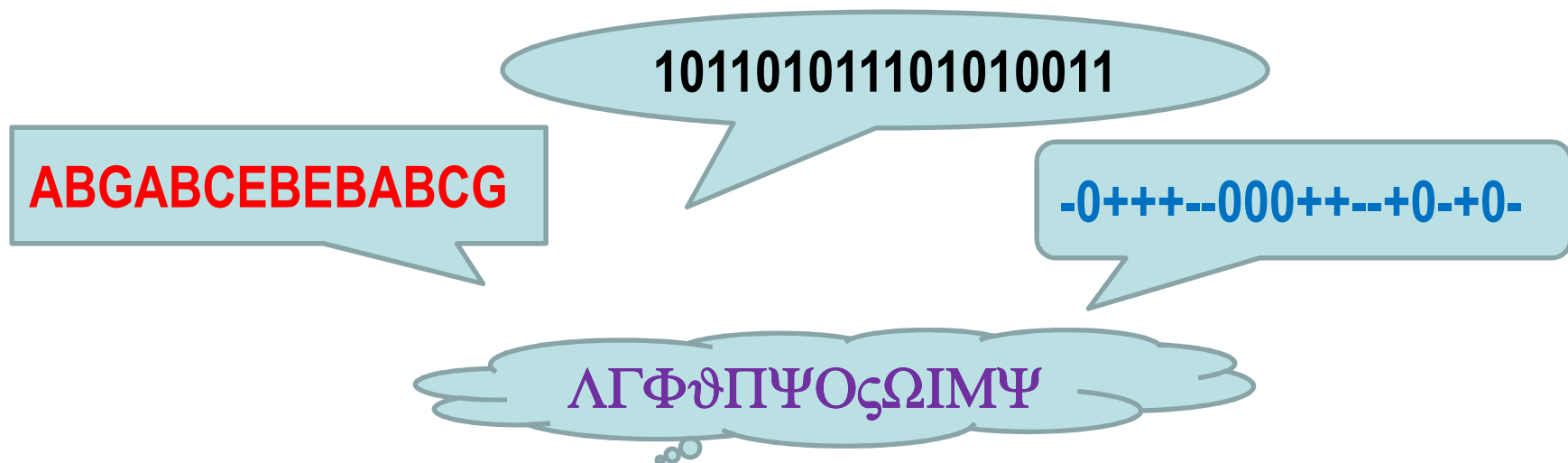


Sensor to Shooter Timeline

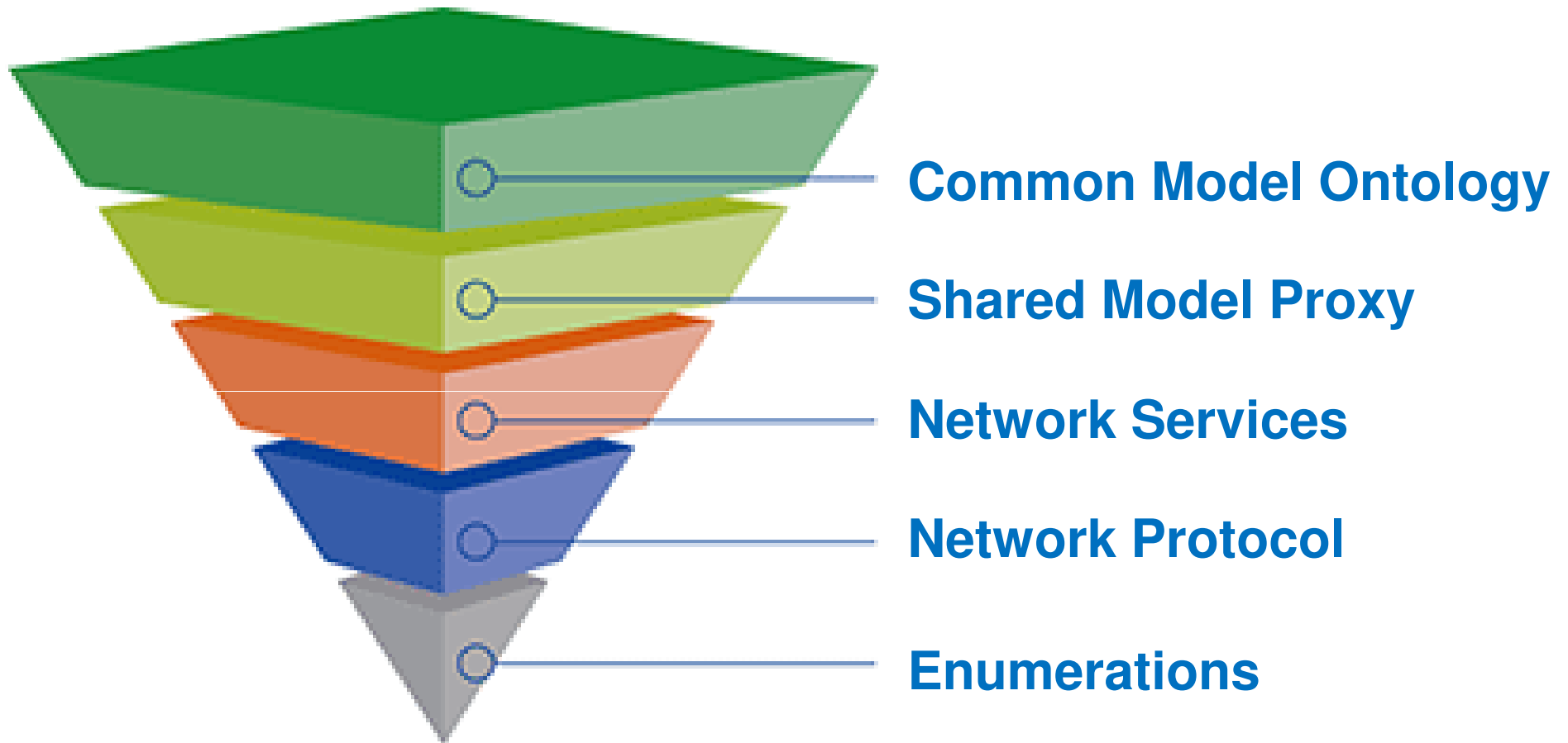


Translators

- Every device speaks a different language
- There is always a need for translation of bits, words, packets, and forms
- Standards for Interoperability can significantly reduce, but never eliminate this need



Standards in System Interoperability



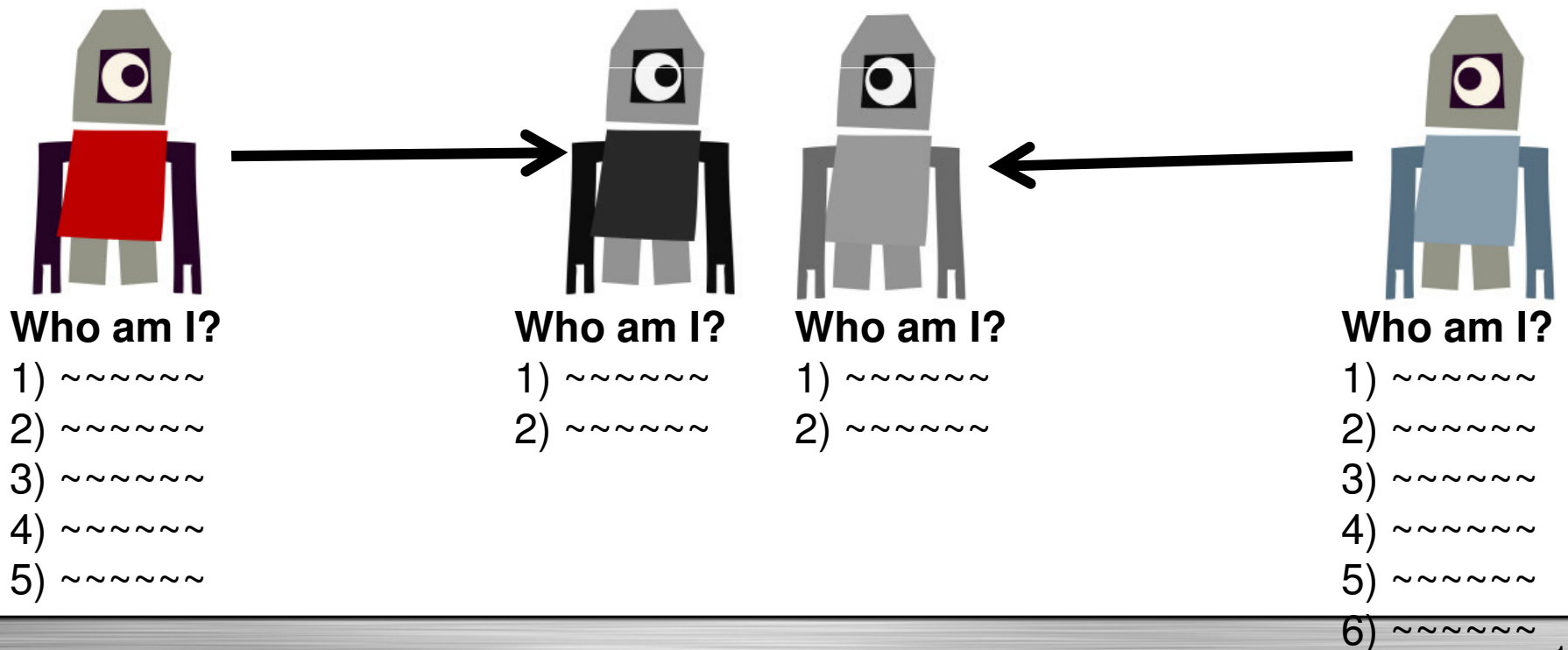
Common Model Ontology

- A formal representation of knowledge as a set of concepts within a domain, and the relationships between those concepts.
- Used to reason about the entities within that domain.
- Required to allow models to interact with each other.
 - What are you?
 - How are you related?
 - What can I do to you?



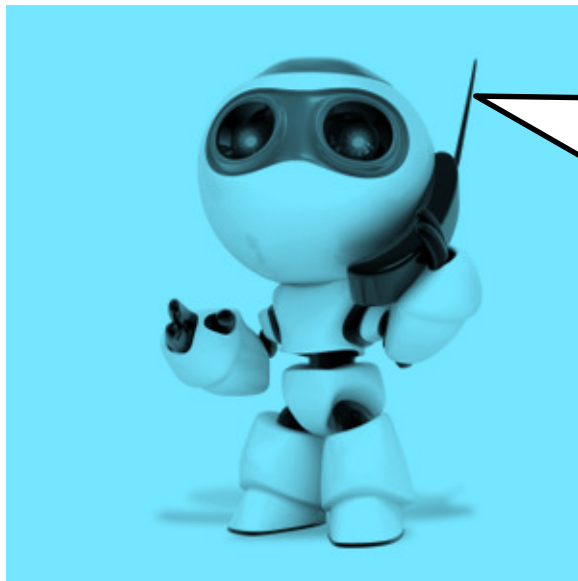
Shared Model Proxy

- A representation that is a minimal, but essential substitute for the modeled object.
- Provides a least-common-denominator of state values that can be universally agreed upon.

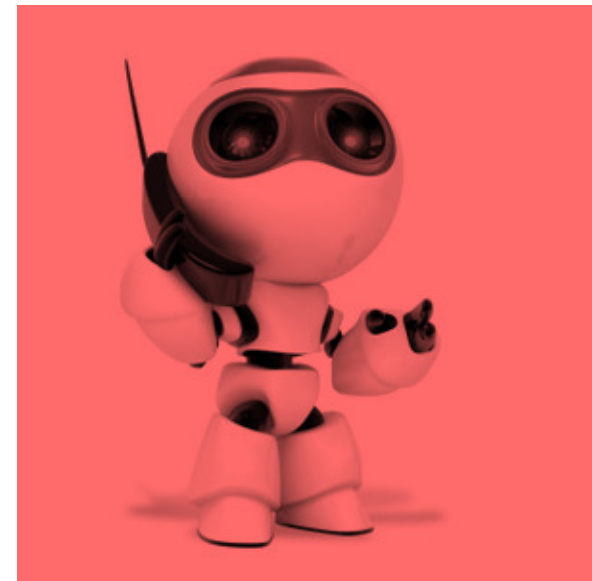


Network Services

- **Provided by a common software library that will perform actions in the same manner for everyone.**
- **Reduces duplicate software and duplicate errors.**
- **Increases standardization of actions, processes, and protocols**

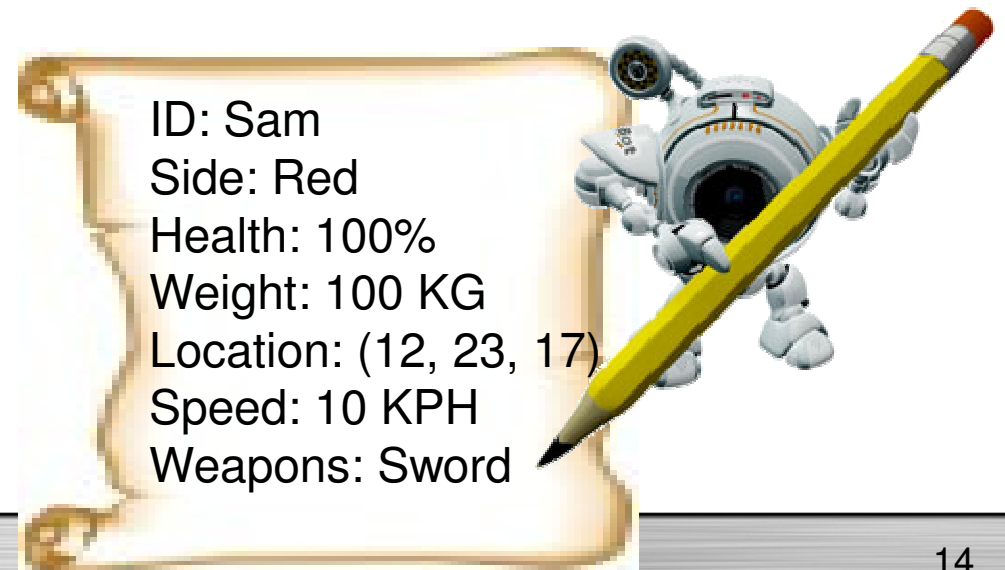


Press 1 to send greetings
Press 2 to send a bomb
Press 3 to intercept calls
Press 4 to jam all radios



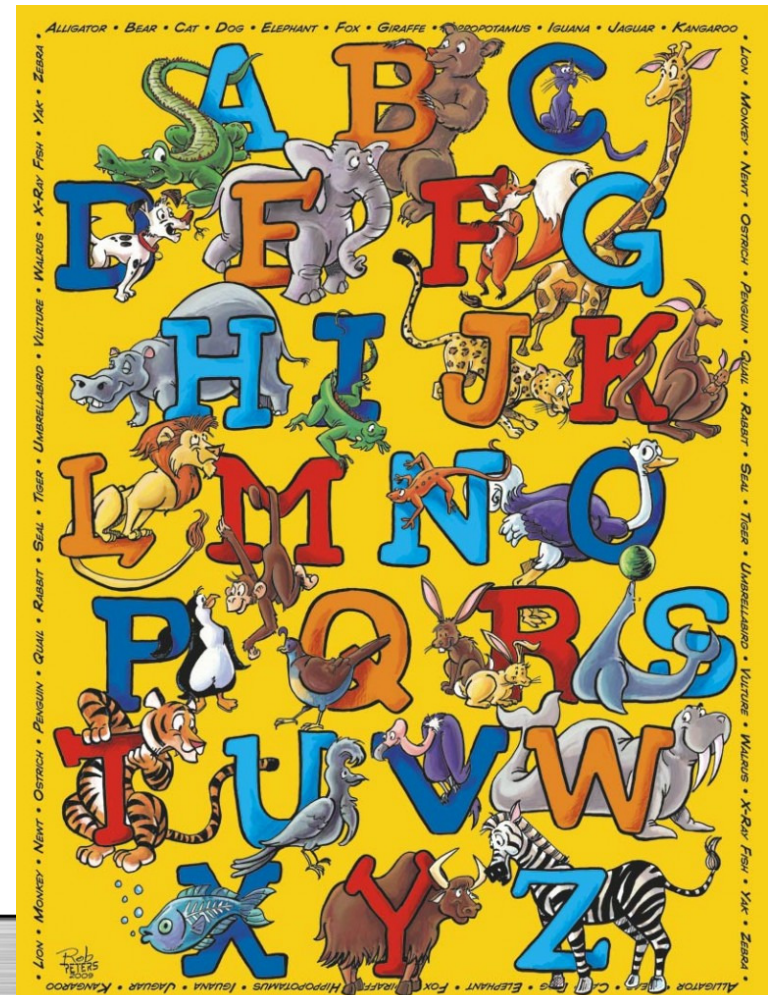
Network Protocol

- **Simulation state information is encoded in formatted messages and exchanged between computers and simulation systems.**
- **One popular protocol (DIS 6) defines 67 different message types (PDUs), arranged into 12 families.**



Enumerations

- An exact listing of all of the elements in the set.
- These compactly encode data that needs to be understood by different computer programs.
- Ground Vehicle = 100
 - Tank = 101
 - Truck = 102
 - Robot = 103
- Air Vehicle = 200
 - Fighter = 201
 - Tanker = 202
 - Cargo = 203
- Naval Vehicle = 300
 - Carrier = 301
 - Battleship = 302
- Terrain = 400
 - River = 401
 - Tree = 402
 - Bridge = 403
 - Building = 404



Medical / Military Collaboration on Standards

- **Are both communities prepared to collaborate?**
- **Are they able to persist long enough to bridge differences in vocabulary, history, customer needs, funding, etc?**

- **Simulation Interoperability Standards Organization**
 - **Medical Simulation SIG**
- **Society for Simulation in Healthcare**
 - **Committee on Technology and Standards**

- **Slides available at: Modelbenders.com**